

2007 RESEARCH PROBLEM STATEMENT

Problem Title: Evaluation of Optimal Traffic Monitoring Station Spacing on Freeways

No.: 07.06-05

Submitted By: Dave Kinnecom

Email: dkinnecom@utah.gov

Project Champion: David Kinnecom, Traffic Management Engineer

(UDOT or FHWA employee who needs this research done, will help the Research Division lead this project, and will spearhead the implementation of the results. If the project gets prioritized at the UTRAC conference, a Champion Commitment Form will be required before funding.)

1. Briefly describe the problem to be addressed.

Performance measures on freeway travel are developed from traffic monitoring stations which gather volume and speed data. This data is used for several purposes: a) providing real-time speed on the website, which is color-coded based on three speed thresholds; b) calculation of real-time travel times, which is now posted on variable message signs (and which, in the future, will be placed on UDOT's CommuterLink web site) ; and c) used for performance measure tracking. It is likely that other uses of speed data will be applied in the future, such as determining travel time reliability.

UDOT has typically installed traffic monitoring stations at one-half mile intervals. This spacing dates back to theories that the traffic monitoring stations would be used to detect incidents in real-time. For example, Illinois DOT had such a system in place prior to the common use of cameras. Now, the use of cameras and cell phones has made the use of speed data for incident detection less important. The problem to be determined in this research is to evaluate the trade-off between detector spacing and accuracy of estimates I speed, travel time, and reliability.

2. Strategic Goal: ☐ Preservation ☐ Operation ☐ Capacity ☐ Safety (check all that apply)

3A. List the research objective(s) to be accomplished:

1. Develop recommended criteria for placement of speed detection stations on freeways , considering trade-off between spacing and accuracy.

3B. List the major tasks to accomplish the research objective(s):

Estimated person-hours: 1000

1. Review existing UDOT data.
2. Develop an analytical model or method to calculate travel time and travel time reliability measures based on hypothetical detector spacing.
3. Using results of step 2, test alternative detector spacing to determine relationships between accuracy and spacing.
4. Define recommended spacing.

4. Estimate the cost of this research study including implementation effort (use person-hours from No. 3B): \$50,000

5. Indicate type of research and/or development project this is

Large: ☐ Research Project ☐ Development Project
Small: ☐ Research Evaluation ☐ Experimental Feature ☐ New Product Evaluation ☐ Tech Transfer Initiative
☐ Other: _____

(A small project is usually less than \$20,000 and shorter than 6 months)

6. Outline the proposed schedule (when do you need this done, and how will we get there):

We estimate that this project will take one years to complete.

2007 RESEARCH PROBLEM STATEMENT

7. What type of entity is best suited to perform this project (University, Consultant, UDOT Staff, Other Agency, Other)?

A University

8A. What deliverables would you like to receive at the end of this project? (e.g. useable technical product, design method, technique, training, workshops, report, manual of practice, policy, procedure, specification, standard, software, hardware, equipment, training tool, etc.)

Report, including analytical techniques, and recommendations.

8B. Describe how this project will be implemented at UDOT.

This will affect the location of traffic monitoring stations included in UDOT's ITS systems.

8C. Describe how UDOT will benefit from the implementation of this project, and who the beneficiaries will be.

If the conclusion is to increase the spacing (i.e. install fewer stations), there will be a cost savings.

9. Describe the expected risks and obstacles as well as the strategies to overcome them.

There are relatively few risks, since the project consists of "mining" existing data, and developing theoretical relationships from the data.

10A. List other people (UDOT and non-UDOT) who are willing to participate in the Technical Advisory Committee (TAC) for this study:

<u>Name</u>	<u>Organization / Division / Region</u>	<u>Phone</u>	<u>Email</u>
Dave Kinnecom	UDOT Traffic Operations Center	887-3707	
Bryan Chamberlain	UDOT Traffic Operations Center	887-3723	
Chris Siavrakas	UDOT Traffic Operations Center	887-3620	

10B. Identify other Utah, regional, or national agencies and other groups that may have an interest in supporting this study:

Cities, Counties who operate traffic signals. UDOT planning and consultants who develop traffic models.